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ABSTRACT

The purpose of the study was to examine the relationship of the limitation and outcome of simultaneous speech to those dimensions of personality indexes by Cattell's 16PF Questionnaire. More than 500 conversations of 24 female college students were computer-analyzed for instances of simultaneous speech, and the frequencies with which they initiated interruptive and noninterruptive simultaneous speech were compared to their 16PF scores and those of their conversational partners by means of hierarchical multiple regression analyses. The results suggest that the personalities of both participants in a conversation influence the initiation of each participant's simultaneous speech but not its outcome. (Author)

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Personality and Simultaneous Speech[1]

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A pivotal feature of the rhythmic pattern of conversation is the alternation of speakers. So characteristic is this feature that Miller (1963) has suggested it warrants the status of a language universal. He pointed out that, since the masking properties of speech are relatively poor with regard to other speech, such alternation may not represent an obligatory pattern of conversational interaction. Jaffe and Feldstein (1970) have suggested that speaker switching, or turn-taking, behavior in conversation may be a consequence of information processing limitations of the central nervous system. If so, such behavior -- while perhaps not obligatory -- represents the strategy by which mutual conprehensibility is most adequately achieved. Other investigators (Duncan, 1972; Markel, 1973; Yngve, 1970) have also recognized that the function of taking turns in a conversation is not primarily to satisfy the dictates of etiquette, and Schegloff (1968) has proposed that the phenomenon be considered a basic rule of conversation. It is of some interest, therefore, that violations of the rule have elicited relatively little systematic attention. The rule is violated by the occurrence of simultaneous speech, which is defined as speech uttered by the participant who does not have the floor while the

CG 009 395

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participant who does have the floor is actually speaking.

On the basis of their outcomes, segments of simultaneous speech (SS) may be divided into two categories: interruptive simultaneous speech (ISS) and noninterruptive simultaneous speech (NSS). An NSS segment is one that begins and ends while the participant who has the floor is talking. ISS is part of a segment of speech that begins while the participant who has the floor is talking but ends after he has stopped. Only that portion of the segment uttered while the other participant is still talking is considered ISS. Note that the names, ISS and NSS, are not meant to imply anything about the intentions of the participant who initiates them. Both types of simultaneous speech are illustrated in Figure 1. Given that a participant obtains possession of the floor with the first sound he utters alone, ISS culminates in a change of which participant has the floor while NSS does not. It should be mentioned that, contrary to the rather fanciful distinction suggested by Yngve (1970), "having the floor" and "having a turn" are used here to refer to the same phenomenon; a participant's turn -- the time during which he has possession of the floor -- is defined as beginning with the first sound he utters alone and ending with the first unilateral sound uttered by the other participant.

Few studies have been reported that are concerned with simultaneous speech, and even fewer that are concerned with simultaneous speech as defined here. A significant study by Meltzer, Morris and Hayes (1972) explored the importance of vocal amplitude and its interaction with simultaneous speech duration as determinants of what were called "successful" and "unsuccessful" interruption outcomes, defined in the same ways as ISS and NSS, respectively. Gallois and Markel (in press) found that the frequency of turns following simultaneous speech, an index that appears to be equivalent to the frequency of ISS, was higher during the middle five minutes of unconstrained conversations than during the first and last five minutes. Most relevant to the present study

is a report by Feldstein, BenDebba and Alberti (1974) that the frequencies with which conversational participants initiate ISS and NSS are consistent both within the same conversation and across different conversations by the same participants. It may be inferred from these results that there are reliable differences among individuals in the extent to which they initiate NSS and ISS during their conversations. The major purpose of the present study was to assess the possibility, made viable by such results, that the initiation frequencies of ISS and NSS are related to aspects of the initiators' personalities.

Simultaneous speech has tended to be regarded as frequently reflecting a contest for the floor, and its outcome viewed as "winning" or "losing" the floor (Meltzer, Morris & Hayes, 1971). It is probably from this perspective that some investigators have conjectured about a relationship between the outcome of simultaneous speech and dominance (Gallois & Markel, in press). At the beginning of this study, however, no reliable information was available about possible associations between simultaneous speech and personality characteristics. Thus, the study reported here was exploratory in intent and correlational in approach.

The dimensions of personality investigated by the study were those measured by Cattell's Sixteen Personality Factor Questionnaire (Cattell, Eber & Tatsuoka, 1970), referred to as the 16PF. In the 25 years since its publication, the 16PF has been subjected to extensive research that has shown its scales to be reliable and valid, and applicable in a wide variety of situations.

Method

The subjects of the study were 24 female college students whose ages ranged from 17 to 23. They were divided into six subgroups of equal size, or "quartets." The study required that each member of a quartet converse with every other member of the quartet for half an hour on each of eight occasions about one or more

of a range of topics provided for the purpose. Thus, each subject engaged in three conversations on each occasion. On the day preceding the first occasion the subjects were asked to complete Form A of the 16PF.

The conversations took place in a sound-attenuated room furnished as a comfortable office. The two subjects engaged in conversation sat facing each other in upholstered chairs, and each subject's microphone was suspended from the ceiling immediately in front of her but above her line of vision. The conversations were recorded on a professional model Ampex stereo-taperecorder located outside the experimental room.

The completed forms of the 16PF were scored by computer. The sound and silence patterns of the conversations were analyzed for instances of simultaneous speech by a special analogue-to-digital converter system (Jaffe & Feldstein, 1970), and each subject was credited with the numbers of ISS and NSS segments she had initiated during the course of each of her conversations. There were, therefore 72 ISS and 72 NSS scores for each occasion. These were averaged across occasions to yield the 72 ISS and NSS scores used in the statistical analyses.

Results

The basic question asked by the study is whether the persoanlity of an individual engaged in conversation influences the frequency with which he initiates simultaneous speech. However, there also seemed to be a not unreasonable possibility that an individual's initiation frequency reflects the influence of not only his own personality characteristics but those of his conversational partner. Finally, a question implied by categorizing simultaneous speech in terms of its outcome is whether the outcomesare differentially associated with the same personality characteristics or are associated with different personality characteristics.

Statistical Design

Sixteen hierarchical multiple regression analyses were conducted to examine the issues involved in these questions. Each regression equation used the initiation frequencies of the subjects as its dependent variable and the scores of the subjects and their conversational partners on one of the factors of the 16PF to form its independent variables. The specific independent variables were: (1) a categorical variable called Outcome that identified which of the frequencies of the dependent variable were ISS and which were NSS; (2) a variable called Subjects that consisted of the factor scores of the subjects; (3) a variable called Partners that consisted of the factor scores of the subjects' conversational partners; (4) a variable called Subjects by Partners, or S x P, that consisted of the algebraic products of the subjects' and partners' factor scores and, as a function of its order in the equation, assessed the amount of variance contributed by the interaction of the subjects' and partners' factor scores to the frequency with which simultaneous speech was initiated; (5) a variable consisting of the algebraic products of the scores on the Outcome and Subjects variables; (6) a variable formed from the algebraic products of the scores on the Outcome and Partners variables; and (7) a variable formed from the algebraic products of the scores on the Outcome, Subjects and Partners variables. By virtue of the point at which they entered the equation, variables 5, 6, and 7 served to index possible interaction effects among the Outcome, Subjects and Partners variables. As such, they addressed the issue of whether the two outcomes of simultaneous speech were differentially related to the dimensions of personality that were examined. Parenthetically, it might be mentioned, for the benefit of those concerned about using the products of two continuous variables to detect interaction effects, that on none of the factors were the scores of the subjects and their partners statistically related.

The seven variables, then, were entered in stepwise fashion into the solution of each equation, and the results at each step are presented in Table 1. Note that their names are across the top of the table and, proceeding from left to right, are in the order in which they entered the regression equation. Each row in the table identifies one of the personality factors of the 16PF and indicates that the entries in that row summarize the regression analysis of the scores of that factor. Proceeding from left to right, the columns labelled $\underline{r}_p$ list the successive orders of partial correlation coefficients yielded by the regression analyses. The columns labelled $\underline{R}^2_i$, i.e., $\underline{R}^2$ increment, list the proportions of variance contributed by the independent variables to the dependent variable after the contributions of intervening variables to the dependent variable have been taken into account.

Outcome

The significant $\underline{r}_p$ associated with the Outcome variable indicated that there is a real difference between the mean ISS and mean NSS frequencies of the dependent variable. On the average, ISS was initiated approximately 28 times during the course of a conversation whereas NSS was initiated about 45 times.

Characteristics of the Subjects

The significant $\underline{r}_p$s associated with the next step of the equations indicate that it was the subjects who received low rather than high scores on Factors L, O, and Q4, and high rather than low scores on Factor I who more frequently initiated simultaneous speech. What aspects of personality are measured by the factors? The coefficients of Table 2 show that, for the subjects of this study, Factors L, O, and Q4 are significantly interrelated. To save time, therefore, the descriptions provided here combine a selection of all the terms used by the Handbook of the 16 PF (Cattell, Eber & Tatsuoka, 1970) to interpret the three factors. Persons who received low scores on the factors -- those who more

frequently initiated simultaneous speech -- are characterized as easygoing, relaxed, conciliatory, complacent, secure, and insensitive to the approbation or disapprobation of others. Persons who score high on the factors are said to be suspicious, dogmatic, irritable, apprehensive, self-reproaching, tense, frustrated and driven. The interpretation of Factor I will be discussed shortly.

Characteristics of the Partners

The next step in the equations indicates that the frequencies with which the subjects initiated simultaneous speech were also influenced by those personality characteristics of their partners that are indexed by Factors A, C, F, H, and Q2. Factor H will be discussed with Factor I. Note from Table 2 that although Factors A, F, and Q2 are related to each other, Factor C is only related to Factor A. The regression analyses indicate that the subjects initiated more simultaneous speech when they had partners who had received high scores on Factors A, C, and F and low scores on Factor Q2, when, in other words, their partners could be described as good-natured, cooperative, attentive to people, emotionally mature, realistic, talkative, cheerful, and socially group dependent.

Joint Effects of Subjects' and Partners' Characteristics

Lastly, the third step of the equations indicates that interactions among certain aspects of the personalities of both subjects and their partners also influenced the subjects' initiation of simultaneous speech. The interactions are depicted in Figures 2a, b, and c, and involve Factors H, I, and M. The Handbook describes persons who score low on Factor H as shy, timid, restrained, and sensitive to threat, while persons who score high are described as adventurous, "thick-skinned," genial, and socially bold. The results of the regression analysis, as shown in Figure 2a, indicate that although, in general, the subjects initiated more simultaneous speech while talking to partners who scored high on Factor H than to partners who scored low, the initiation frequencies of subjects who

received low scores on the factor -- the shy, timid, restrained subjects -- were affected to a significantly greater degree by the factor scores of the partners than were those of subjects who received high scores.

Figure 2b depicts an interaction effect similar to, but more exaggerated than that of Figure 2a. Those subjects who scored low on Factor I -- subjects described as "tough-minded," unsentimental, self-reliant, and practical -- initiated, on the average, less simultaneous speech than did subjects with high scores on Factor I -- those subjects described as sensitive, dependent, insecure, attention-seeking, and imaginative. However, the initiation frequencies of subjects who scored high on the factor were apparently unaffected by the factor scores of the partners, whereas those of subjects who scored low on the factor show a significant positive relation to the factor scores of the partners.

Finally, the analysis of Factor M yielded the interaction effect graphed in Figure 2c. It indicates that those subjects who scored high on the factor -- characterized by the Handbook as imaginative, unconventional, absent-minded, absorbed by ideas, and fanciful -- initiated more simultaneous speech when talking to partners who scored high than to partners who scored low. On the other hand, those subjects with low scores on the factor -- subjects characterized as "down-to-earth," conventional, prosaic, earnest, and concerned with immediate interests and issues -- initiated more simultaneous speech with partners who had low scores.

Note that no subsequent steps in the equations yielded significant coefficients. It must be inferred, therefore, that the results provide no evidence that the personality characteristics of the subjects and their partners had any influence on the outcome of simultaneous speech.

Combined Effect of all the Characteristics

One further regression analysis was performed in order to obtain an estimate of the combined influence of those personality factors shown by the 16 previous

equations to be related to the initiation of simultaneous speech. Four sets of independent variables were entered into the regression equation. The first set consisted of the variable called Outcome. The second set consisted of the subjects' scores on Factors H, I, L, M, O, and Q4; the third set, of the partners' scores on Factors A, C, F, H, I, M, and Q2; and the fourth set, of the subject-partner product scores on Factors H, I, and M. As in the other equations, the dependent variable consisted of simultaneous speech frequencies. The analysis yielded a multiple correlation coefficient of .55, which is significant beyond the .05 level and indicated that the personality factors in the equation account for approximately 30% of the variability in the frequencies with which simultaneous speech was initiated. Interestingly, the personality characteristics of the subjects contributed 8 % of the variance, whereas those of their partners accounted for 16 % of the variance. The interactions among these characteristics accounted for 6 %. Each of these contributions is statistically significant.

Discussion

Clearly, the study needs to be replicated; the results require, if you will, cross-validation. As they now stand, however, they suggest that the extent to which an individual initiates simultaneous speech in a conversation is, indeed, influenced by aspects of his own personality. But it is also influenced, they suggest, by personality characteristics of his conversational partner. Persons who are relaxed, complacent, secure, and not particularly dependent upon the approval of others tend to initiate more simultaneous speech than those who are generally apprehensive, self-reproaching, tense and frustrated. Regardless of their own personality characteristics, however, individuals tend to initiate more simultaneous speech when they converse with people who are cooperative, attentive, emotionally mature, and talkative, than with people who are aloof, critical, emotionally labile, introspective, silent, and self-sufficient.

These results seem to be intuitively sensible. Even the interaction effects revealed by the analyses make sense; it seems reasonable that persons who are shy, timid, dependent, and attention-seeking are more responsive to the influence of others than are persons describable as "thick-skinned," socially bold, unsentimental, and self-reliant.

What appears almost counter-intuitive and quite surprising is that none of the 16 personality factors were related to the outcome of simultaneous speech. It seems much more likely that the outcome, rather than simply the initiation, of simultaneous speech would be affected by personality characteristics. It may well be the case, however, that the presumed relationship between personality and outcome speech is mediated by what might be called contextual, or situational, variables. One such variable, for instance, could be the stated or apparent purpose of a conversation. The experimental dialogues in the present study were casual and unconstrained, and were explicitly defined for the participants as vehicles for their getting to know each other. It is possible that the task-oriented and/or argumentative dialogues enable the occurrence of relationships between certain personality dimensions and the outcome of simultaneous speech. The implication here is that there is an interaction of outcome, personality and situation such that personality is differentially related to ISS and NSS only in certain situations.

On the other hand, it may be that while personality attributes influence the initiation frequency of simultaneous speech, its outcome is determined largely by psychophysical attributes of the vocal signals. Meltzer, Morris & Hayes (1971) have demonstrated the importance of the amplitude changes that characterize the voices involved in simultaneous speech segments, the durations of the segments, and the frequency of the segments, as predictors of outcome. Perhaps, then, whatever role personality plays in determining outcome is mediated through its relationship to these attributes.

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Table 1

Hierarchical Multiple Regression Analyses of the Relations between the Frequencies with which Simultaneous Speech is Initiated by the Participants in a Conversation and the Participants' Scores on the Scales of the Sixteen Personality Factor Questionnaire (16 PF)

Factors (16PF)	Independent Variables: Outcome (O)		Subjects (S)		Partners (P)		S x P		O x S		O x P		O x S x P	
	r_p	R_i^2	r_p	R_i^2	r_p	R_i^2	r_p	R_i^2	r_p	R_i^2	r_p	R_i^2	r_p	R_i^2
A	.480**	.230	.093	.007	.388**	.115	.109	.008	-.109	.008	.078	.004	.036	.001
B	.480**	.230	-.025	.001	-.031	.001	.040	.001	-.031	.001	.033	.001	.000	.000
C	.480**	.230	.146	.017	.186*	.026	.120	.010	-.007	.000	.019	.000	.012	.000
E	.480**	.230	-.100	.008	.106	.009	-.050	.002	-.052	.002	.021	.000	-.029	.001
F	.480**	.230	-.048	.002	.215*	.036	-.131	.013	-.145	.015	.033	.001	-.045	.001
G	.480**	.230	-.054	.022	-.002	.000	-.158	.019	.000	.000	-.024	.000	.021	.000
H	.480**	.230	-.012	.000	.344**	.091	-.183*	.023	-.113	.008	.103	.007	-.067	.003
I	.480**	.230	.189*	.028	.143	.015	-.198*	.029	-.014	.000	.077	.004	-.033	.001
L	.480**	.230	-.205*	.032	-.118	.010	.012	.000	-.019	.000	.035	.001	-.013	.000
M	.480**	.230	-.085	.006	-.152	.018	.269**	.054	.036	.001	-.019	.000	.088	.005
N	.480**	.230	-.070	.004	.149	.017	-.171	.022	-.044	.001	-.007	.000	-.013	.000
O	.480**	.230	-.174*	.023	-.089	.006	.080	.005	-.112	.009	.009	.000	.029	.001
Q_1	.480**	.230	-.036	.001	-.062	.003	-.115	.010	.123	.011	-.102	.008	-.040	.001
Q_2	.480**	.230	.082	.005	-.287**	.063	-.132	.012	.087	.005	-.112	.009	.000	.000
Q_3	.480**	.230	.113	.010	.074	.004	-.055	.002	.097	.007	.015	.000	-.041	.001
Q_4	.480**	.230	-.189*	.027	-.123	.011	.044	.001	-.143	.015	.024	.000	.005	.000

Note. The independent variables were entered into the stepwise regression analyses in the order in which they are listed, beginning with Outcome. Each row summarizes the solution of one regression equation by providing, for each step, the partial correlation coefficient (r_p) and the proportion of variance by which the dependent variable is incremented (R_i^2). The variable, Outcome, compares those simultaneous speech frequencies of the dependent variable which are interruptive (ISS) with those that are noninterruptive (NSS). The variables, Subjects and Partners, compare the 16 PF scores of the conversational participants to the frequencies of the dependent variable. Although each subject is multiply represented at each step by virtue of having had three partners, the significance of the F ratio associated with each R_i^2 was evaluated on the basis of 1 df for the numerator and 23-k df for the denominator, where k=1 for the first step and is incremented by 1 for each successive step.

* $p < .05$

** $p < .01$

Table 2

Product Moment Correlation Coefficients Yielded by Comparisons among Ten Factors of the Sixteen Personality Factor Questionnaire

Factors	C	F	H	I	L	M	O	Q_2	Q_4
A	.556	.518	.675	.054	-.371	-.230	-.293	-.628	-.229
C		-.066	.321	-.049	-.634	-.185	-.732	-.278	-.702
F			.658	-.185	.185	-.225	.183	-.565	.298
H				-.266	-.032	-.050	-.254	-.665	-.059
I					-.087	.247	.219	.197	.150
L						.217	.506	-.071	.695
M							-.095	.193	.147
O								-.006	.779
Q_2									-.050

Note. With 22 df, an $\underline{r} \geq .404$ is significant at or beyond the 5% level.

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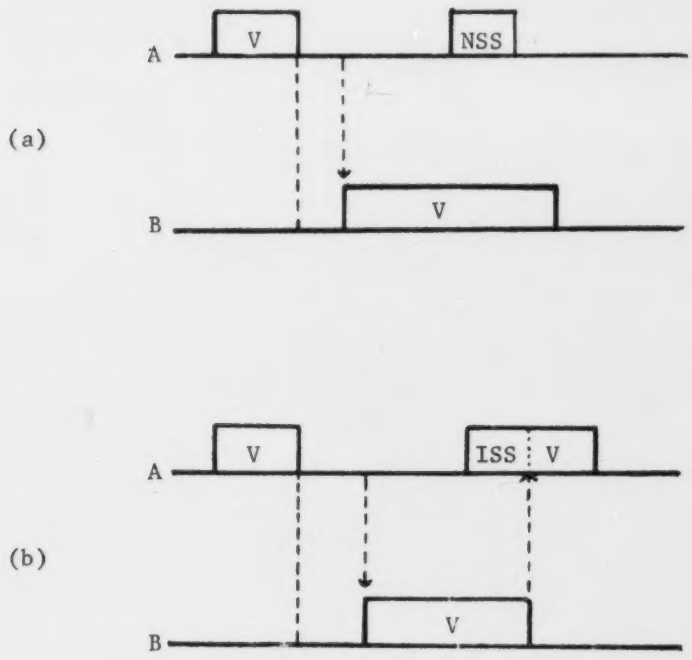

Fig. 1. Diagram (a) illustrates the occurrence of a segment of noninterruptive simultaneous speech (NSS) in the speech stream, while diagram (b) illustrates the occurrence of a segment of interruptive simultaneous speech (ISS). The letter "V" stands for vocalization, a segment of speech that includes no discernible silence. The arrow that points down indicates the end of speaker A's turn; the arrow that points up indicates the end of speaker B's turn. A speaker's turn is the time during which he has the floor. Note that ISS results in a change of which speaker has the floor (in the cae above, A obtains the floor from B), while NSS does not.

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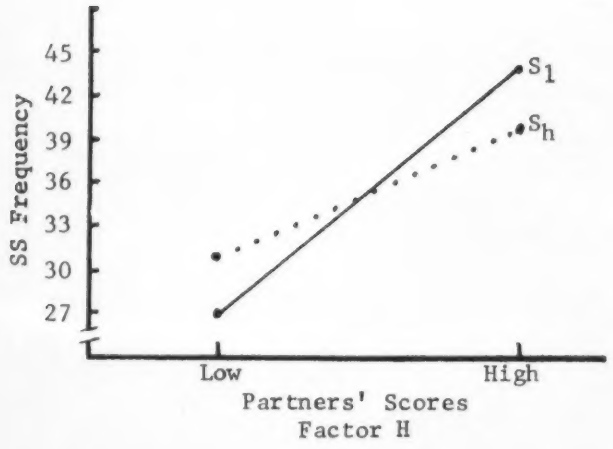
(a)



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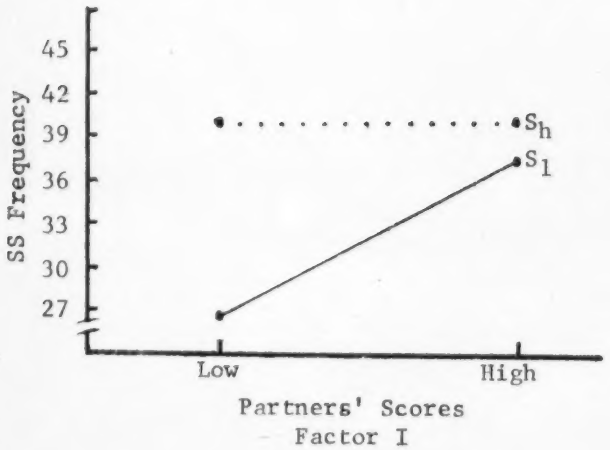

(c)

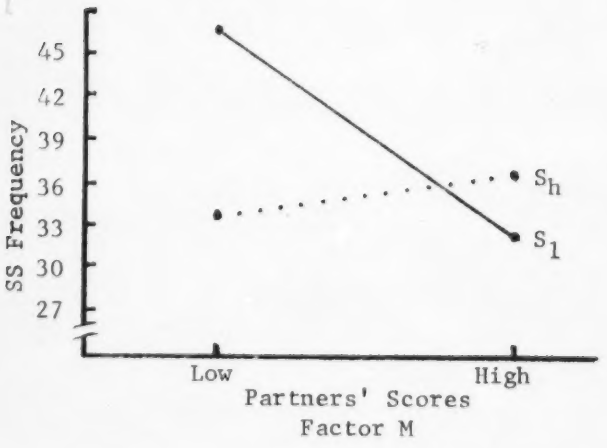

Fig. 2. Estimated frequencies of simultaneous speech (SS) for subjects who scored high (S_h) and subjects who scored low (S_1) on 16PF Factors H, I, and M as a function of whether their partners scored high or low on the factors.